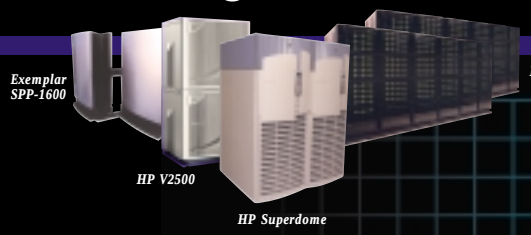
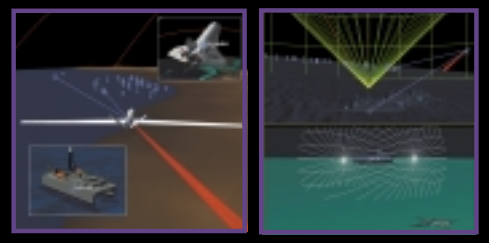
SPAWAR Systems Center San Diego

High Performance Computing and Networking
SSC San Diego Distributed Center

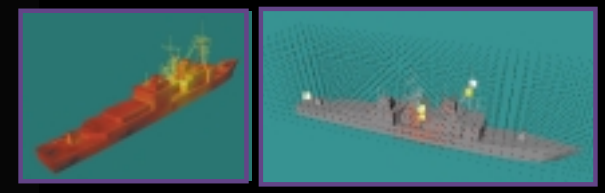


Computational Scientists Delivering Technological Advantage to the Warfighter



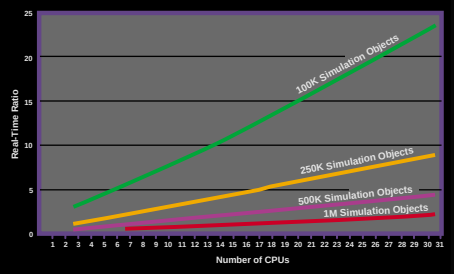
Advanced Virtual Intelligence, Surveillance, and Reconnaissance (ADVISR)
R. A. Pritchard

Results and Significance: ADVISR is a scalable and portable HPC software developed at SSC San Diego to help build and test systems and metasystems in virtual reality. ADVISR is presently being used to virtual-prototype the Deployable Autonomous Distributed System (DADS). This is a wide-area networked field of low-cost sensors that can operate in an undersea environment to detect, locate, classify, and neutralize the quiet submarine as a potentially dominant threat in littoral warfare.



State-of-the-art Electromagnetic Design Software and Virtual Prototyping: Affordable Technology to the Warfighter
C. W. Manry, Jr. and J. W. Rockway

Results and Significance: EIGER is state-of-the-art electromagnetic design software that takes full advantage of HPC resources for future integrated topside designs of U.S. Navy vessels. With the aid of EIGER, new technologies in composite structures, multi-function antennas, and electronically steered arrays are taken into account in the design and evaluation of future advanced communication systems.



An HPC Run-time Infrastructure (RTI) for High-level Architectures (HLAs)
L. J. Peterson and J. S. Steinman

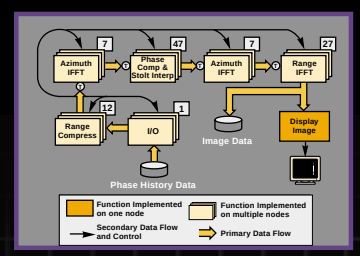
Results and Significance: An HPC-RTI built on SPEEDES is a scalable software tool developed at SSC San Diego for executing, in real-time and faster-than-real-time, a high volume of simulation objects (currently up to 1,000,000) in support of HLA-type simulation. The HPC-RTI supports a distributed mix of HLA Federates and Federations to interact with SPEEDES, the HPC-RTI, and other new-generation RTIs in a large-scale simulation.

Data Distribution Environment for Signal Processing Applications on Parallel Architectures
P. P. Partow and D. M. Cottel

Results and Significance: The SSC San Diego Scalable Programming Environment (SPE) software provides a means for developing scalable, parallel signal- and image-processing applications that can, by simple recompilation, be ported to various HPC architectures and, ultimately, to embedded systems. The concepts were proven on an Intel Paragon and are now in use on the Hewlett-Packard V2500 and Superdome at the SSC San Diego Distributed Center.

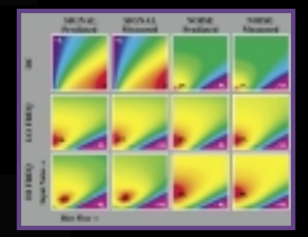
World Wide to Regional Mapping Engine
L. McCleary

Results and Significance: A portable software mapping engine has been developed that uses vector data to display maps ranging in scale from world wide to highly detailed areas of any region of the earth. This government-owned and patented system, known as the "Caricature Map Draw Module," has proven to be extremely reliable and flexible in meeting the requirements of numerous DoD applications for organizations within the Navy, Army, Marine Corps, Joint Staff, and the National Reconnaissance Office (NRO).



Synthetic Aperture Radar Image Formation (SARIF)
C. Yerkes and J. M. Weber

Results and Significance: A scalable Synthetic Aperture Radar (SAR) image formation software tool has been developed for DoD surveillance systems. SAR uses advanced parallel multidimensional spectral analysis and interpolation techniques and is portable across a range of HPC platforms. This software tool has been ported to multiple HPC platforms including SGI Origin 2000, IBM SP2, HP V2500, and Windows NT.



Scalable Sensor Modeling
M. E. Inchiosa and A. R. Bulsara

Results and Significance: Scalable and portable HPC software has been developed for modeling nonlinear sensor arrays. This software tool has allowed confirmation and evaluation of new modes of operating magnetic sensors based on arrays of superconducting quantum interference devices (SQUIDs). Improved magnetic sensors may aid the warfighter by detecting underwater targets at ranges far greater than presently possible.

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